Proposal

On

Study of Drought Management in Rajasthan: A financial Analysis

Proposal for Doctoral Degree

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Introduction

The manual on Natural Disaster Management in India (2001) declares drought a relentless visitor in India. The 10th five year plan (FYP) state that natural disasters as borderless and merciless.

According to the National Drought Monitoring Centre (NDMC), USA, in most areas that experience drought, It is a normal, recurrent feature of climate', and not a rare and random event. They also say that drought is a temporary aberration and differs from aridity since the latter is restricted to low rainfall regions and is a permanent feature of climate. Drought Manual of Ministry of Agriculture, India 2006 explains that an acute drought is an event where, due to scarcity of water, for any reason - though mostly on account of scanty (-60% to -90% of normal rain) or deficient rains (-20% to 059% of the normal) results in substantial failure of agricultural operations causing loss of rural livelihood and reduction in over-all availability of water for human/cattle/crop consumption.

Wilhite in 2000 explained that though, drought is a normal feature of climate and its recurrence is inevitable, yet, there remains much confusion within the scientific and policy community about its characteristics. It is precisely this confusion that explains, to some extent, the lack of progress in drought management in most parts of the world. Wilhite in 2003 further stated that the hydrological droughts originate from persistent periods of abnormally low precipitation but it is not entirely naturally induced event. Drought is a creeping phenomenon which engulfs whole economic and social life of the affected region for the worse.

Experts consider Drought as the most complex but least understood of all natural hazards, affecting more people than any other hazard. Droughts cause misery to both human and livestock population, accelerate degradation of natural resources and put a heavy pressure on government's resources through relief measures. Widespread crop failures leading to acute shortages of food and fodder adversely affecting human and livestock health and nutrition, scarcity of drinking water accentuated by deteriorating ground water quality and declining water tables leading to large scale migration are the major manifestation of droughts.

Narain et al in 2000 analysed the drought management efforts in India and said that to mitigate/overcome the adverse effects of droughts and to combat desertification, the government of India has pursued strategies and implemented several development programs since 1970. These programs include Drought Prone Area Program initiated in 1973-74, Desert Development Program started in 1977-78, National Watershed Development Program in rain-fed areas, started in 1990 etc. Later Drought proofing- preparing the drought prone area in advance was enunciated as a policy goal for the first time in 1987. Before this the scarcity management has been an important part of the administrative and policy agenda of

independent India. K Mathur and NG Jayal, 1993, defined Drought proofing as an effort of strengthening the local natural and human production resource base which can provide a certain desirable amount of food, fuel, fodder, drinking water and livelihood resources during a drought.

Types of Drought –

Bandyopadhyay (1988) argues that the various forms of droughts get generated independently but inseparable and are linked to each other through the water cycle.

Bandyipadhyay (1988) lists four types of droughts, namely

1. Meteorological drought,

2. Surface water drought,

3. Ground water drought and

4. Soil-water drought.

The National Commission on Agriculture in India defines three types of droughts, namely,

a. meteorological,
b. agricultural and
c. Hydrological droughts

Strategy to combat Drought and Famine in the Indian arid region (2000) published by Central Arid Zone Research Institute (CAZRI), Jodhpur groups drought in following types -

Meteorological drought

Results from a shortfall in precipitation and is based on the degree of dryness relative to the normal or average amount and the duration of the dry period. This comparison must be region specific. Though Rainfall deficiency on its own, however, does not always create a drought hazard.

Hydrological drought

This involves a reduction of water resources such as streams, groundwater, lakes and reservoirs. Its definition involves data on availability and off take rates in relation to the normal operations of the system (domestic, industrial, irrigated agricultural) being supplied.

One impact of this type of drought is competition between users for water in these storage systems. Over- exploitation of Groundwater has been recognised as a serious problem in India

since the late 1980s causing hydrological drought. (Moench 1992; Dhawan 1990, 1995; and Macdonald et al 1995).

Agricultural drought

It is the impact of meteorological and hydrological droughts on crop and livestock production. It occurs when soil moisture is insufficient to maintain average plant growth and yields. The impact of agricultural drought is difficult to measure due to the complexity of plant growth and the possible presence of other factors that may reduce yields such as, quality of seeds pests, weeds, low soil fertility and poor agricultural practices.

Famine drought

This can be regarded as an extreme form of agricultural drought, resulting from metrological and hydrological droughts where food, fodder and water shortages are so severe that large number of people become unhealthy or die. Famine disasters usually have complex causes.

Although scarcity of food is the main factor in a famine, death can result from other complicating influences such as disease or lack of access to water and other services.

However the famine is not an inevitable consequence of drought. Drought is an act of nature, whereas famine is the result of specific agrarian relations compounded by government policy on relief which in turn depends on the policy of drought management.

Socio-economic drought

When the supply of some goods or services such as water, fodder or electric power is weather dependent, drought may cause shortages. The concept of socio-economic drought recognises the relationship between drought and human activities. For example, poor land use practices exacerbate the impacts and vulnerability to future droughts.

While any of the above types may result in an acute drought, the hydrological and agricultural varieties are frequently endemic in certain areas such as Rajasthan which needs long-term measures rather than crisis management or emergency response required in case of acute drought situation. In other words, 'Crisis Management' is most frequently required in case of Meteorological Drought although the crisis precipitated by an acute drought acquires extraordinary severity where Hydrological Drought is already in evidence.

The impact of Drought

Narain, Rao and Abrol listed the effect of drought as widespread crop failures leading to acute shortages of food and fodder adversely affecting human and livestock, health and nutrition;

scarcity of drinking water accentuated by deteriorating ground water quality and declining water tables leading to migration. (Narain, Rao, Abrol 2000)

One of the sectors where the immediate impact of drought is felt is - Agriculture.

The direct impacts of drought can be classified under four broad categories

a. physical,
b. social,
c. economic and
d. environmental

This study will concentrate on the impact of drought and economics of its management strategies.

Droughts have potentially important implications for government policies, first and foremost, via their impact on the budgetary balance.

A drought is likely to reduce tax revenue via a decline in income, employment and exports. On the expenditure side, increased expenditure on relief, social welfare, health and water supplies, consumption-related subsidies on food distribution, and the logistical costs of drought-related imports may confront government.

Increased budgetary pressures, resulting from lower revenues and higher expenditure, can be met by both external and internal borrowings, higher taxes or imposing new taxes. Also, reallocation of planned government expenditure may occur within or among sectors and between capital and recurrent spending with varying opportunity costs.

There are major limitations in defining a drought and deciding a single management strategy as -

1. Drought is perceived as a creeping phenomenon because its' onset and end are often difficult to identify. Clear distinction between non-drought and drought is absent;
2. Drought is generally viewed as a transient phenomenon. As a result, it is usually not taken seriously once the rains have returned; it is considered as a calamity and managed as an event;
3. The direct impacts of drought direct impacts like withering crops, dry watering points, reduced forage for livestock etc., are obvious. Second and third order effects, such as price rise, increased food imports, surges in rural-urban migration rates, are not recognised and estimated in full.

The traditional strategies of drought management involved making water tanks and wells by state and donors for drinking water purpose. Increasing irrigation facility was also one of the ways to fight water scarcity and drought in the region. Gang Canal was inaugurated in 1927 to provide water security in Bikaner region followed by Rajasthan Canal in 1960 after independence. It is been more than one century since the government has started funding efforts for fighting the drought but still we have not been able to strengthen venerable regions like Rajasthan against the recurrent droughts.

The Strategies for fighting a drought is two folds.

1. Drought adaptation – involves providing relief to people and economy of drought hit area through subsidies, employment and food.
2. Drought Mitigation – these are long term strategies aimed at drought proofing of venerable area like development of water harvesting structure, changing crop patterns etc.

Drought management strategies in India

It was in the 19th century in the British period that first time a policy to combat famine or scarcity condition was put in place on recommendation of the Famine Commissions in 1891. The Government took upon itself the responsibility to save lives and reduce starvation deaths by offering gratuitous relief and providing short term employment on public works as far as possible near the habitat of the affected population. Since the 20th century, Famine Code was in place and efforts were made to undertake major irrigation works as well as use rail transportation on large scale to move food from surplus areas to scarcity areas.

Initially the declaration and management of drought followed the famine code and manuals to minimize deaths from starvation. But after independence major changes were brought in to shift focus from drought adaptation to drought mitigation. Finance commission, a constitutional body, is entrusted with the making recommendation of fund allocation to various states according to their need in wake of a natural calamity. But the system still lacks the objectivity in the process of recommendation of fund by finance commission and allocation by Union government.

The efficient management of drought depends on the planning by the state government and funding these efforts usually by the union government. Thus financial management of drought plays a major role in adoption of a suitable and sustainable strategy to fight any natural calamity or disaster.

Drought in Rajasthan

Rajasthan is the largest State of India with a land area of 342239 Square Km. Rajasthan is the largest State of India with 10.4% of the country's total area and around 5% of the country's population. According to the census 2011 Rajasthan has population of 68.62 million with population density of 201 persons per square kilometer.

The geographical situation of the state is harsh as 12 districts of the State, which comprise of 60% of the area falling within the Great Indian Desert of Thar. 64% of its population resides in this area despite scanty rainfall with all its variation, timing and intensity. This is the most populous desert in the World.Reports on water resources published by Government of India in 2004 mentions that the state has only 1% of India's water resources. The climate of Rajasthan State varies from arid to sub-humid. Low rainfall coupled with erratic behavior of the monsoon in the State makes Rajasthan the most vulnerable to drought.

Based on historical data Rathore (2002) has summarized the frequency of occurrence of droughts in the State is given in table-

Table: Frequency of drought in Rajasthan

S.No.	Recurrence Period (Year)	Districts
1	Once in 3 years	Barmer, Jaisalmer, Jalore, Jodhpur and Sirohi
2	Once in 4 years	Ajmer, Bikaner, Bundi, Dungarpur, Sriganganagar, Nagaur, Hanumangarh and Churu
3	Once in 5 years	Alwar, Banswara, Bhilwara, Jaipur Jhunjhunu, Pali, Sawai Madhopur, Sikar, Dausa and Karauli.
4	Once in 6 years	Chittorgarh, Jhalawar, Kota, Udaipur, Tonk, Rajsamand and Baran
5	Once in 8 years	Bharatpur and Dholpur

East Rajasthan is mainly semi arid except the districts of Jhalawar, Banswara, Parts of Chittorgarh, Sirohi and Kota, which are Sub humid according to mean Thornthwaites's moisture index. Arid, semi arid and Sub humid zone are 58%, 36% and 6% of the total land area of the state respectively. (Banerjee et al 1975) The arid regions are characterized by wide variation in rainfall, soil type, irrigation facilities and micro-ecological conditions. The average rainfall of Rajasthan is 574 mm but it varies significantly across different regions. (MS Rathore 2005)

Jodha in 1975 explained that drought is a localized condition. Owing to spatial variability of rainfall even at short distances and inter-household resource difference, households in a given

cluster of villages are not exposed uniformly to crisis during a drought year. (Jodha 1975, Walker and Jodha 1985) Recurrent drought a poor resource base for economic development, the highest cost of development per capita due to aridity and very low density of population, low level of literacy at 67.06% (particularly among women at 52.1%), a very high rate of population growth and scarcity of water make the task of socio-economic development a challenge compared to many other States in the country.

Literature Review

The lack of a precise and objective definition of drought in a specific situation is an obstacle to it's understanding, which leads to indecision and/or inaction on the part of policy makers. Experts do not view drought in a unified way. Their perception of drought is complex and responses often unpredictable. (MS Rathore 2005)

The perception of drought also depends on local socio-economic conditions. The expected impact of drought and responses are significantly related to both the age and experience of a farmer (Taylor 1987). These Perceptions also shape the responses to drought and the confusion on what drought is may cause difficulties in dealing with the hazard. (MS Rathore 2005)

Benson and Clay defined social and economic drought in 1998. According to them Social drought relates to the impact of drought on human activities, including indirect as well as direct impacts; and Economic drought is a meteorological anomaly or extreme event of intensity, duration (or both), outside the normal range of events that enterprises and public regulatory bodies have normally taken into account in their economic decisions and that, therefore, results in unanticipated and usually negative, impacts on production and the economy in general. Benson and Clay says that the extent and intensity of drought impacts is determined by prevailing economic conditions, the structure of the agricultural sector, management of water resources, cereal reserves and overall economy of the region. (Benson and Clay, 1998).

Report of the Workshop on Setting up a 'Mechanism for Continuous and Integrated Drought management', mentions that state intervention in drought management started in 1844 when 'Girdavari' system was established by Maharajas of Bikaner and Jodhpur in the Rajasthan. (Ministry of Agriculture, 2007)

Report of The Technical Committee on Drought Prone Areas Program (DPAP) And Desert Development Program (DDP) by CH Hanumantha Rao Committee, 1994 says that there are strong links between poverty and proneness of an area to drought. Samra pointed out that as substantial share of total funds were used to provide employment in creation of large number of works of low priority with little or no productive or development impact. JS Samra, 2004, further states that the relief programs were intended to create permanent productive assets which could provide the basis for further development. But the substantial relief employment requirements led the state governments to emphasize employment generation in designing program components.

Narain mentions that the two programs were reviewed by a high level committee, which submitted a report in 1994. Even after more than two decades of implementation of program like Drought Prone Area Program (DPAP) and Desert Development Plan (DDP) , the achievements of these programs were rated as dismal. (Narain et al 2000)

Jodha pointed out that in recent decades the traditional small scale need based mobilisation of resources for intra-community transfers have been replaced by social transfers at the macro-level through drought relief through government policies. (Jodha 1975) The funds and supplies are controlled and distributed by Central or State governments through the district administration. Their focus remains on transfers of relief resources like fodder and fuel from outside, rather than generate, conserve, and mobilise them from within. (Mathur 1989, Rangaswamy 1989) Under the current management practices of drought, the quantification of losses by conventional revenue surveys has to wait till maturity of the crop and delays the response. Though exigencies some time necessitate waiving off the traditional system and rough estimation of crop loss by the local revenue official mostly Patwari. Samra had suggested that Modern methods of remote sensing, GIS, GPS, modeling and real time communication can accelerate the process. (Samra, JS 2004)

Rationale of the study

With increasing financial dependence of the state on the center in Indian federal system, the relief from natural calamities is also funded by union government. The utilization of these funds is entrusted with the state government. The policy for fighting a drought has been shifted from famine relief to drought proofing since Independence. But the coveted goal has not been reached due to gaps in management strategies of drought.

The study will identify the gap in drought management policies in the major areas of fund allocations, identified through literature review, and will suggest strategies for increasing the efficiency of drought management in Rajasthan. The study is likely to benefit the policy makers in fine tuning the drought management practices.

Objectives

- To study the existing management system of drought
- To identify the major areas of Drought Management
- To understand the fund allocation in identified areas
- To assess the fund utilization in identified areas
- To identify gaps in financial management of drought
- To recommend strategies for drought proofing for Rajasthan

Methodology

The study of financial management of drought will be limited to the drought management in state of Rajasthan. The study would be exploratory in nature carried out with secondary data published by Union of India and State of Rajasthan.

Design

The first phase of the study a description of fund allocation in wake of a drought in Rajasthan by both union and state government and related control for the purpose will be studied. The description will be obtained through a review of budget allocations of union and state government, funding through Calamity Relief Fund (CRF). State drought manual will explain the procedures, organization charts and job description of officers involved in management of drought. Analysis of expenditure in Disaster Management particularly dealing with drought in Rajasthan since independence will give us a clear view of current situation and ground realities. The review of the drought management system will include policy analysis and a detailed study of drought management strategies and processes of the state government.

The study of budget will include re-classification of related budget heads in to two parts.

1. Budget heads related to adaptation measures of drought
2. Budget head related to mitigation measures of drought

A details study of fund flow in drought management will be carried out to establish distribution of funds in to various related heads and its effect on various drought management activities. The major component of drought management strategies will be identified in the process.

Test of efficiency of financial management of drought will be carried out by study of major component of drought management identified by the literature review. The major component in drought management can be broadly categorized as Drinking water availability, Ground water recharge, Availability of Food through PDS, Employment generation and Live stock situation and fodder availability.

The deviation of the major component identified in the study will be compared with optimum level-an average during the normal rain years, which will show us that how drought management strategies have worked in wake of a drought year and how it has impacted or prepared Rajasthan for Drought Proofing.

The sources of Data

The study will be based on secondary data published Government of India, State of Rajasthan, comptroller and auditor general (CAG) and Reserve Bank of India (RBI). Literature Review will

be based on previous research, published reports of government agencies, International research and donor agencies.

Tools for Data Collection and Analysis

Secondary Data published by Union of India and Government of Rajasthan will be used in the study. Appropriate analytical and statistical tools will be applied for data analysis.

Chapter Outline_–

I. Introduction:
II. Review of Literature
III. Methodology
IV. Data analysis
V. Result
VI. Discussion
VII. Summary
Conclusion
Suggestion
Implication of the study
VIII. References
Books & Reports
Journals
Magazine

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